

REMARKS

In the Office Action, claims 1-5, 8-10, 12-13, 15-17, and 19-26 were pending at the time of the Office Action dated August 28, 2008.

Claims 1-5 and 8-10 are cancelled, and claim 16 and 20 are amended. Claims 12-13, 15-17, and 19-26 are now pending. Reconsideration and allowance of the pending claims is respectfully requested in view of the amendments or the following discussion.

Rejections in view of prior art

Claims 12-13, 15-17, and 19-26 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Pub. No. 2003/0093067 to Panescu (herein the Panescu reference) in view of US Patent No. 6,301,496 to Reisfield (herein the Reisfield reference). Claims 12-13, 15-17, and 19-26 stand rejected as being unpatentable over U.S. Patent No. 6,896,657 to Willis in view of the Reisfield reference.

1. Subject Matter of Application

By locating the image with respect to a first set of heart data acquired via the location of the leads, and locating the probe relative to the second set of heart data (which may be via the location of the leads), then registering the first heart vector relative to the second vector can thereby automatically register the probe relative to the image. The second set of heart data may be acquired either before or after the probe is inserted into the imaged subject. Thus, the probe does not have to be inserted in the imaged subject in order to define the heart vectors or either to register the probe relative to the image.

2. Discussion of Cited References

The Panescu reference discloses a system to map movement of treatment element 164 of a treatment device 162 through a subject (see paragraph 35). The imaging device includes an ultrasound imaging element 124 to acquire image data of the subject volume. (See paragraph 39). The Panescu reference also discloses a mapping subsystem 140 with elements 144, 145 "to gather positional data 'within' the subject volume that correspond to specific target sites identified for treatment ... " See paragraph 34 (emphasis added). The Examiner acknowledges that the Panescu reference does not disclose registering the probe which is in or adjacent to the heart with the image using a heart vector of the heart.

See page 6 of Office action dated June 12, 2007. Moreover, the Panescu reference does not show or disclose electrical leads of an ECG system.

The Reisfield reference discloses an ECG monitor 73 with electrodes 52, and a mapping system 18 with a position signal generating device 28 at a mapping catheter 20. Col. 17, lines 1-27. The Reisfield reference discloses aligning a grid 90 relative to an image of the heart, and a flexible matching technique is employed to move or shift grid points relative to location data acquired at the sampling points of the catheter 20 at the heart tissue. Col. 20, lines 48-60. The described data includes an electrical conduction vector representative to a conductive velocity of the heart based on acquired local activation times (LATs) measured at sampling points with the catheter 20. See col. 18, lines 20-24; col. 20, lines 48-60; col. 24, lines 2-13; col. 25, line 26-42.

The Willis reference discloses positioning transducers 36 located at the distal end of the catheter 24 traveling through the imaged subject. Col. 17, lines 1-5 and Figure 2.

3. Arguments over Cited References

a. Independent Claim 12

Claim 12 recites a method that comprises, inter alia, acquiring an image of or pertaining to a heart; acquiring a first data set pertaining to one or more locations of a heart vector of the heart, the first data set being spatially correlated with the image; acquiring a second data set pertaining to one or more locations of the heart vector of the heart; and registering a representation of a probe with the image by registering the location of the heart vector from the first data set with the location of the heart vector from the second data set, where the second data set is acquired using 'at least one lead positioned on a skin surface', wherein the location of the heart vector from the second data set can be determined 'relative to the lead', and wherein the location of the probe can also be determined 'relative to the lead'. (emphasis added).

Neither of the cited references disclose the above-described subject matter. As noted above, the Reisfield reference merely discloses an ECG monitor 73 having leads 52. Col. 17, lines 1-5. The Reisfield reference discloses the vectors of illustrated figures correlate to sampling points of LATs acquired with the catheter 20 at the tissue of the

heart. However, the Reinsfield reference does not disclose heart vectors dependent on acquired data from the ECG leads at the surface of the skin of a patient, as recited in claim 12. Moreover, the Reisfield reference does not disclose registering the location of the leads (and thereby the data acquired by the leads) 52 of the ECG monitor 73 relative to the image or the probe. The Willis reference fails to correct these deficiencies. Similar to the deficiency of the Penescu reference, the Willis reference merely discloses mapping transducers 36 attached at a catheter 24 traveling through or adjacent to the heart. See Fig. 2 and col. 17, lines 1-5 of Willis Reference. For at least these reasons, the cited references do not teach or suggest the limitations of claim 12. Accordingly, reconsideration and allowance of claim 12 is respectfully requested.

Claims 13 and 15 depend from claim 12 and are believed allowable for at least the same reasons that claim 12 is believed allowable. Claims 13 and 15 may also include patentable subject matter in addition to that recited in claim 12.

b. Independent Claim 16

Claim 16 as amended recites a method that comprises, *inter alia*, acquiring an image of or pertaining to a heart; registering a location of a first heart vector from a first data set relative a lead system at a skin surface of an imaged subject, wherein the first heart vector represents a summation of electrical currents at a particular time, the summation having a direction and an amplitude; registering a location of the second heart vector from the second data set relative to the lead system; and adjusting the size or position of the image dependent on a change in the location between the first and second heart vector generated from the first and second data sets, respectively.

For reasons similar to those described above with respect to claim 12, none of the cited references disclose first and second heart vectors from a first data set relative to a "lead" system at a skin surface of the imaged subject, as recited in claim 16. (emphasis added). Moreover, as acknowledged by the Examiner (see page 9 of Office Action dated August 28, 2008 and page 12 of the Office Action dated June 13, 2007), none of the cited references disclose adjusting the image dependent on a change in location between the first and second vectors relative to the lead system. For at least these reasons, the cited

references do not disclose each and every limitation of the claimed subject matter. Accordingly, reconsideration and allowance of claim 16 is respectfully requested.

Claims 17 and 19 depend from claim 16 and are believed allowable for at least the same reasons that claim 16 is believed allowable. Claims 17 and 19 may also include patentable subject matter in addition to that recited in claim 16.

c. Independent Claim 20

Claim 20 recites a system that comprises, inter alia, “a lead system located at a skin surface of an imaged subject” and operable to acquire a first data set and a second data set pertaining to one or more locations of a first and second heart vector, respectively, of the heart; a processor configured to be communicatively coupled to a probe, the probe being configured to be located in or adjacent to a heart; memory configured to store: an image of at least a portion of the heart; the first data set pertaining to one or more locations of the first heart vector of the heart, the first data set being spatially correlated with the image; the second data set pertaining to one or more locations of the second heart vector of the heart; a display configured to display the image and a representation of the probe, the image being registered with the representation of the probe by registering the first heart vector from the first data set with the second heart vector from the second data set, wherein the location of the heart vector from the second data set can be determined relative to the lead, and wherein the location of the probe can also be determined relative to the lead.

For reasons similar to those described above with respect to claims 12 and 16, the cited references do not disclose first and second heart vectors from a first and second data acquired with a “lead” system at a skin surface of the imaged subject, and registering the heart vectors from the first and second data sets relative to one another as determined relative to the lead, as well as the location of the probe relative to the lead, the probe located in or adjacent to the heart, as recited in claim 20. (emphasis added). Rather, the Reisfield reference discloses heart vectors from data acquired with a probe and location device 28 traveling the heart, as described above. See col. 16, lines 46-67 and col. 17, lines 1-27. A review of the other cited references fails to correct these deficiencies. For

at least these reasons, the cited references do not teach the patentable subject matter recited in claim 20.

Claims 21-26 depend from claim 20 and are believed allowable for at least the same reasons that claim 20 is believed allowable. Claims 21-26 may also include patentable subject matter in addition to that recited in claim 20.

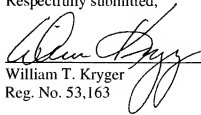
CONCLUSION

Applicant believes that the present application is in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

No fees are believed due with this communication. Yet, the Commissioner is hereby authorized to charge any additional fees which may be required regarding this application or credit any overpayment to Deposit Account No. 070845. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension and authorizes payment of any such extension fees to Deposit Account No. 070845.

The Examiner is invited to contact the undersigned at telephone number (262) 548-4654 if it is felt that a telephone interview would advance the prosecution of the application.

Respectfully submitted,



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Date: November 25, 2008

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